



New Forests' Timberland Investment Outlook 2011-2015  
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## **About New Forests**

New Forests ([www.newforests.com.au](http://www.newforests.com.au)) is an investment management firm specialised in timberland and associated environmental markets, such as carbon, biodiversity and water. The company offers investment strategies to institutional and private equity clients across sustainable forestry and emerging ecosystem services markets in Australia, New Zealand, Asia and the US. New Forests is headquartered in Sydney, Australia, with staff in New Zealand, Washington, DC, San Francisco and Kota Kinabalu, Malaysia.

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## Preface

New Forests is an investment management business offering commingled closed end funds and private accounts across targeted investment strategies in the timberland and environmental markets asset classes. We seek to define our investment strategies in a way that provides clients with specific exposures to attractive opportunities across geographies and market segments. We undertake thorough research, market analysis and extensive networking with a wide range of economic, political and non-governmental organizations to form our views and convictions on the nature of markets and the investment strategies best able to capitalize on market movements and trends.

In this paper we step back and take a look at the big picture. The world has gone through substantial changes in the past 2-3 years, and many of these changes have significant effects on the timberland investment sector. With many factors at play, the complexity makes it difficult to understand the overall trends that may affect current and near term investment allocations to the timberland asset class. To help work through this, the paper discusses the underlying drivers affecting the timberland asset class with particular reference to geography, market exposure and new thematic investment offerings, such as bio-energy. It discusses how new markets may emerge, how timber and biomass will compete with other commodities and materials, how our finite land base will be allocated and how global environmental and social challenges will affect timberland. We conclude by trying to integrate this into a general picture of how the sector will evolve and where investors should begin repositioning.

To date, approximately 70% of the value of timberland investment by institutional investors has been placed in the United States. Globally, the US has the deepest timberland market and the greatest historical liquidity. While industry commentators still suggest that the majority of the value of the overall asset class suitable for investment is in the US,<sup>1</sup> this will likely shift in the coming decade, as this paper will explain. The predominance of US timberland investment is being affected by economic conditions in the US, the relative strength of product markets in different parts of the world, forestry production capacity and rapidly rising timber demand from emerging markets, led by China. Concurrently, we may also be on the verge of major structural changes in the nature of forestry markets with, for example, newsprint demand flattening or declining, while biomass and bio-energy markets surge. These are no longer hypothetical changes and now must be part of investment strategies.

We welcome feedback and comments on this paper and hope it can contribute to the continuing growth and maturation of the timberland asset class for institutional investors.

A handwritten signature in blue ink, appearing to read "David Brand".

David Brand  
Managing Director  
New Forests Pty Ltd

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<sup>1</sup> Presentation by Brent Keefer, Hancock Timber Resource Group, to "Who Will Own the Forest 6", September 2010, World Forestry Centre, Portland, Oregon.

## 1. Introduction

There have been many written accounts of the origin and subsequent growth of the timberland asset class,<sup>2</sup> which we do not intend to review here. However, it is worth noting that the rise of timberland as an asset class over the past 25 years has been accompanied by increasing recognition of the portfolio allocation benefits for institutional investors. Trees of course grow, and that means that forests are an unusual 'appreciating asset,' which becomes more valuable over time. The core returns from timberland, therefore, are a mix of capital appreciation from growth and income from the harvesting of trees.<sup>3</sup> Given that trees do not have a final point of maturity like agricultural products, there is often significant option value between growing the trees for capital appreciation and cutting the trees for income. In the long term this makes for relatively low volatility in total returns and a generally low correlation with other asset classes.

Timberland has also been attractive because it has traded at higher valuation discount rates than other assets of similar volatility (the "illiquidity premium"). This high return relative to volatility has proven attractive to specialists in portfolio allocation policy advising institutional investors, and the capital commitments to timberland have grown steadily over recent years, with estimates of total institutional investment ranging from US\$50 to US\$60 billion in 2010.<sup>4</sup>

Another feature of the timberland asset class which has been attractive to investors has been evidence that both timberland asset pricing and the value of timber have reasonably strong correlations with inflation and particularly good correlation with unexpected inflation.<sup>5</sup> The correlation of timber pricing with inflation over very long periods of time is somewhat difficult to explain. However, our theory is that to date timber supply has been effectively unlimited as the majority of supply has come from natural forests, with economic timber supply controlled by an economic margin – as prices of timber rise, marginally more remote or lower quality forests have been exploited. This means that in effect the costs of harvesting and transport, which correlate with labour costs, energy costs and other inflation linked factors, have controlled the cost base of timber. As we shall see, the endless frontier of timber supply may well be at an end, and the future supply of timber may be driven by the capacity of timber pricing to meet the cost of capital to replant or expand timber plantations.

Further, timber has been seen as a mainstream commodity supporting newsprint, printing and writing papers; sawn and engineered construction materials; and furniture, flooring and other uses. Timber is widely traded internationally, with a global trade of over US\$200 billion per annum.<sup>6</sup> New opportunities in biomass energy, bio-fuels, biomaterials and charcoal, as well as environmental markets for carbon, water

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<sup>2</sup> See, for example, Binkley, C.S., Washburn, C.L. & M.E. Aronow (2006) "Timberland: The Natural Alternative," Ch. 10, pp. 231-246 in B. J. Greer, ed. *The Handbook of Inflation Hedging Investments*, McGraw Hill: New York

<sup>3</sup> Returns also encompass changes in underlying real estate value and a range of non-timber values, such as hunting rights, recreational leases, etc.

<sup>4</sup> A review of the websites of the dozen largest timberland investment managers of unlisted funds and private accounts suggests that they have combined assets under management of approximately US\$40 billion as of end of 2010. With another 20+ managers, the total investment is likely at least US\$50 billion in total, although this is uncertain.

<sup>5</sup> Presentation by Clark Binkley at Timber Invest Europe, October 2010, see [www.ifiallc.com](http://www.ifiallc.com)

<sup>6</sup> Global timber trade statistics can be retrieved at <http://faostat.fao.org/site/628/default.aspx>. The total imports of wood products in 2008 were US\$242 billion.

and biodiversity, may further expand and even transform the nature of the markets timberland assets can supply.

Finally, the maturation of the timberland asset class means that much of the investment infrastructure is already in place, such as investment management, property management, valuation methods, transparency in market pricing and growing asset liquidity. While the forestry sector has had environmental and social issues to address, new certification schemes and opportunities to contribute to large scale positive solutions to sustainability are emerging. As such, timberland remains an attractive alternative asset with strong portfolio diversification benefits and significant new opportunities for investment. We hope this paper provides some insight into how the asset class may evolve in the next few years and some of the key factors that institutional investors may wish to consider in designing timberland portfolio allocations.

## 2. A Transition from Native Forest Logging to Plantation Forestry

The world's supply of timber can be broken into three "baskets:"

- a reservoir of extensive natural forests, primarily in the northern boreal and tropical regions of the world;
- managed natural temperate region forests, primarily in the United States and Europe; and
- emerging new plantation regions such as Latin America, Australia and New Zealand, Southern Africa and Asia.

### *Natural Forests*

The extensive natural forests in countries such as Canada, Russia, Indonesia, Brazil, Papua New Guinea, the Democratic Republic of Congo and Gabon are still going through a primary harvest. In the past these forests acted as a natural buffer on timber pricing, and more supply could be brought to market in response to price spikes, such as the 1994 spotted owl decision which withdrew substantial timber supply from the US market.<sup>7</sup>

However, the commercially accessible timber is now diminishing, and new investment in plantation timber will be needed to support growing future timber needs. The marginal cost of extracting remote or poor quality natural timber from Siberia or Papua New Guinea is now becoming similar to the cost of producing plantation timber in Brazil, New Zealand or other higher productivity plantation regions. There is also an increasing level of resistance to further logging of primary forests. Recent agreements to curtail logging of the Canadian boreal forest,<sup>8</sup> a suspension on new concessions for conversion of natural forests in Indonesia<sup>9</sup> and an agreement to end natural forest logging in the Australian state of Tasmania<sup>10</sup> are accelerating the removal of frontier forests from the wood supply equation. This may lead to real price appreciation in timber and possibly higher price volatility.

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<sup>7</sup> The Northern Spotted Owl was put on the US Endangered Species list in 1990, triggering a reduction in timber harvesting from old growth forests in the Pacific Northwest.

<sup>8</sup> See <http://www.canadianborealforestagreement.com/>

<sup>9</sup> See [http://www.norway.or.id/Norway\\_in\\_Indonesia/Environment/-FAQ-Norway-Indonesia-REDD-Partnership-/](http://www.norway.or.id/Norway_in_Indonesia/Environment/-FAQ-Norway-Indonesia-REDD-Partnership-/)

<sup>10</sup> For further information on the Tasmanian Forest Accord see recent article at:

[www.ethicalinvestor.com.au/index.php?option=com\\_content&task=view&id=4033&Itemid=402](http://www.ethicalinvestor.com.au/index.php?option=com_content&task=view&id=4033&Itemid=402)

### ***Managed Natural Temperate Forests***

There are tens of millions of hectares of semi-natural plantations<sup>11</sup> and managed natural forests, primarily in northern temperate and boreal regions, such as the US, Canada, Scandinavia and Europe. The bulk of timberland investment to date, about US\$40 billion out of a total of US\$50 billion, has been placed in these semi-natural plantations, primarily in the US west and south.

These forests have limited commercial opportunity for expansion. For example, it would not be commercially viable to buy even marginal agriculture land in Europe or North America and establish timber plantations. Financial models of this type of reforestation show real Internal Rates of Return of 1-4%, which are unviable investment returns without the addition of direct or indirect subsidies. Semi-natural managed forests, on the other hand, can be bought at 5-6% real discount rates. This would normally suggest (from a purely economic standpoint) that the timber should be cut, but as reforestation would not be an attractive return, the land would be sold.

As these lands have been under continuous timber production, however, they are treated as an overall forest management system with various revenues and costs over time. Nevertheless, the timber supply in these regions, while still very large, is being slowly reduced by conservation easements, regulation and land fragmentation. Further, with low inherent returns, there is little opportunity for commercially attractive increases in investment. In common with the natural forests, the economics are shifting the marginal investment dollar into high quality intensively managed plantations in the southern hemisphere and tropical regions.

### ***Emerging Plantation Regions***

It is estimated that there are 25 million hectares of good quality intensively managed commercial plantation forests in the world, supplying 40% of total timber supply.<sup>12</sup> Much of the development of commercial plantations in the southern hemisphere and tropical regions has been via government support. This has included direct government investment in plantations, subsidies, low interest loans, tax inducements, research and development funding and infrastructure funding. The legacy of these government sponsored plantation forests has been the initial assets that institutional investors have been acquiring in Australia, New Zealand, South Africa and to a lesser degree in Latin America. In the tropical regions there were substantial plantation development programs undertaken with support from the World Bank, national and regional development banks and some private industry (usually with strong financial and tax inducements from government). These, as well as plantations on the balance sheets of listed plantation and pulp and paper companies, are now becoming available to institutional investors, particularly in southeast Asia.

The challenge has been to reach a point where greenfield plantation investments meet a reasonable risk adjusted hurdle rate of return for the country and market conditions. To date the overhang of natural and semi-natural forests which do not operate under normal commercial return drivers has maintained international timber pricing below the cost of capital needed to establish new high value plantations without government support. That now appears to be changing. The rapid growth of log and lumber imports to

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<sup>11</sup> Semi-natural refers to plantations that are primarily reforested with native local species and managed under regimes that are generally less intensive than those undertaken for high-yield timber plantations.

<sup>12</sup> See Kanowski, P.J., and Murray, H. 2008. Intensively managed planted forests: towards best practices. Yale School of Forestry, The Forest Dialogue Report No. 1. 69 pages.

China has created a supply-demand imbalance, and plantation log prices have been rising. While some factors such as the recently renewed Russian log export tax<sup>13</sup> have helped this transition, it now appears to be a trend unlikely to be reversed.

For institutional investors, the 2011 portfolio should include an increasing component of these new plantation regions to balance the semi-natural plantation forestry assets of the western and southern US. This transition will not happen overnight, but over the next decade we may see a shift from the US being two-thirds of the timberland investment base with one-third in other markets to the reverse, in which the bulk of investment capital is in Latin American, Australian, New Zealand, African and Asian assets.<sup>14</sup>

### 3. Competition between Forestry and Agriculture for Land

One important distinction between plantation forestry in the southern hemisphere and tropical regions and the semi-natural forestry of North America and Europe is that the land in the former must be acquired, usually in competition with grazing or other agricultural uses. In US timberland, the value of the asset is generally based on the present value of future timber cash flows (e.g. assumes that for most forest land there is no alternative land use), although there has been a significant real estate component entering the valuation process in recent years.<sup>15</sup> In plantation forestry, the land and the trees are considered separate assets.

The three critical factors in generating returns from plantation forestry are 1) the cost base, e.g. capital cost of land and management costs; 2) the growth rate, which affects how long it takes the timber to grow; and 3) the timber price. Land is a finite resource. With the human population rising to 9 billion over the coming 40 years and the global economy doubling approximately every 25 years, we are already seeing how competition for land by myriad crop and production systems is steadily intensifying:

- In southern Australia, where prime timber plantation regions are found, the land is under competition for dairy farms, cattle grazing, sheep grazing, wheat production, oil seeds, horticulture, viticulture and conservation management endeavours.
- In New Zealand the recent high value of dairy products led to a net conversion of timber plantation areas back to agriculture and declines in the total net stocked area of timber plantations.<sup>16</sup>
- In South Africa the government has strictly regulated further plantation development because of concerns about water usage.

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<sup>13</sup> See <http://www.bloomberg.com/news/2011-01-11/russia-keeps-duties-on-raw-timber-shipments-unchanged-for-2011.html>

<sup>14</sup> The actual “investible universe” of timberland is somewhat in dispute. Hancock Natural Resource Group estimates US\$120 billion based on a strict definition of ‘investible’ (Canada US\$6 billion, USA, US\$78 billion, Australia, US\$5 billion, New Zealand, US\$7 billion and Latin America US\$24 billion). Indufor estimates that there are US\$150 billion in existing high yielding institutional investment quality plantation forests worldwide, with another US\$50 billion of expansion opportunities. IWC estimates a total investible universe including natural and semi-natural forests of US\$700 billion.

<sup>15</sup> In US timberland, real estate that can be sold for a higher value than its value as ongoing timberland (e.g. for rural retreats for the wealthy) is increasingly identified and sold to augment timber returns. This is called Higher and Better Use (HBU) analysis and peaked in importance prior to the 2008/2009 recession.

<sup>16</sup> For updated data on the exotic plantation forest estate of New Zealand see: <http://www.maf.govt.nz/mafnet/publications/nefd/national-exotic-forest-2010/index.htm>



- Latin America and Asian timber plantations must compete with cattle grazing, soybeans and oil palm plantations – all rapidly growing industries in their own right – against a backdrop of increasing support for forest conservation.

Initial investment strategies in plantation regions will appear similar to US timberland management. The pool of “entry assets” that will first attract institutional investors will be government plantation privatizations as occurred in Australia, New Zealand and South Africa, corporate privatizations and other privately funded estates, such as the failed Australian Managed Investment Scheme sector.<sup>17</sup> In most cases these assets are being acquired at a price that does not fully reflect the historical land and management cost inputs. That immediately leads to the question of why not sell the timber and then the land and effectively profit from a liquidation of the estate to so-called “highest and best use” (HBU) agriculture. These plantation estates contain significant option value around timber plantation management strategies, land dispositions and novel management approaches, such as agro-forestry, energy farming, conservation-based payment schemes and carbon markets. While initial management strategies may look like US timberland, we expect significant innovation and evolution in how these assets are managed to optimize returns.

The other critical factor is the substitution of technology for land. By this we mean applying high production systems with state of the art genetic material to increase timber growth rates. Brazil for example has developed management regimes that can grow eucalyptus species at rates of almost 50 cubic metres per hectare per year.<sup>18</sup> Systematic breeding and improved silvicultural management have significantly increased the growth rates of Radiata pine in New Zealand. In Australia a focus on *Eucalyptus globulus*, which has the best pulping characteristics of any tree species, has developed a world scale pulpwood asset (see Figure 1). These higher productivity, higher value forestry regimes can afford to pay more for land and to retain land under forestry production.

**Figure 1 – High intensity management of *Eucalyptus globulus* plantations for pulpwood, Southern Australia**



<sup>17</sup> New Forests has recently reviewed the failure of the Australian MIS sector. See <http://www.newforests.com.au/news/pdf/articles/MarketOutlookMIS.php>

<sup>18</sup> See recent research on Brazilian eucalyptus plantations at: [http://www.fs.fed.us/rm/pubs\\_other/rmrs\\_2010\\_stape\\_i001.pdf](http://www.fs.fed.us/rm/pubs_other/rmrs_2010_stape_i001.pdf)

The wild card for investors over the next decade is timber pricing. The global forestry resource, unlike oil and gas exploration, is transparent with known values for plantation and managed forest areas, productivity and timber quality. With the limits now being approached for exploitation of further natural forests and for increases in productivity of managed semi-natural forests, there is less elasticity in supply against the market price of timber. This means that high demand growth by emerging markets like China, India, Brazil, Indonesia, Vietnam and Thailand will potentially drive real price appreciation to the point where timber returns compete with other land uses. The decadal time frames for expanding plantation assets, however, mean that there is a significant supply lag in response to excess demand, which may produce encouraging results for plantation forestry investors over the next decade.

#### **4. Competition between Timber and Other Building Materials**

We might ask whether timber price rises will simply lead to substitution. Certainly many timber uses can be substituted, for example by plastic formwork replacing plywood formwork or steel house framing replacing wood. Increasing substitution of technology for paper (e.g. internet news versus newsprint and tablet computers rather than books<sup>19</sup>) is certainly occurring, but as we shall see that may itself be overtaken by new markets for energy and biomaterials.

Timber has many attractive characteristics as a building material in addition to the aesthetic. For example, it has the lowest embodied energy when compared with concrete, steel or aluminium. This can be important in a world of rising energy costs, carbon taxes and emissions trading regimes. It is also a renewable material that can be grown in successive rotations and recycled, and it decomposes into relatively benign end-products. Timber is also flexible and adaptable and can be used in a range of engineered materials, such as medium density fibre board, GluLam lumber, particleboard and engineered beams and joists. This allows lower value timber materials to substitute for higher value, larger sized timber.

It can also be safely said that petroleum-based products like plastics will be equally rising in price, as will steel, aluminium and other metals. While concrete and ceramics may make gains, they remain exposed to both carbon pricing and rising energy prices.

Could timber in fact substitute for other building materials in a world of rising energy prices, scarce mineral commodities and carbon price signals? There is some evidence that attempts by steel house framing to substitute for wood have failed given the rising price of steel. There are active research programs to produce bio-plastics and to introduce bio-based materials that are biodegradable substitutes for non-biodegradable materials. At a recent high level conference on sustainability, CEO's talked about reducing waste streams associated with their products, guaranteeing recovery of waste, reducing greenhouse gas emissions and energy usage, reducing water use and setting standards for the sustainability of their products.<sup>20</sup> Timber and bio-based materials should prosper against these emerging societal demands.

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<sup>19</sup> It should be noted that RISI is still forecasting a healthy 3.1% per annum increase in global paper and paperboard through 2025, which translate into more than a 50% increase in the market over the next 15 years..

<sup>20</sup> See <http://www.corporateecoforum.com/>

For investors seeking to introduce sustainability screens into the sectors where they invest, timber and forestry appear attractive and, as we shall see below, may be at the intersection of a set of sustainability related trends.

## 5. Evolution of the Energy Sector – The Emerging Role of Biomass

Globally, the energy sector is facing two transformative issues, climate change and energy security. Prior to the 2008 financial crisis, oil reached nearly US\$150 per barrel, and after collapsing back to US\$70 per barrel in the recession, it is rising again towards US\$100 per barrel. Australian thermal coal pricing from the Port of Newcastle for export to Asia has increased by 250% since it hit bottom in 2009, and coking coal hit a record spot market price of US\$450 per tonne free on board in 2008. It is currently rising again in response to floods disrupting Australian supply to China.<sup>21</sup> The supply of fossil energy, principally oil but also now coal, was once seen as an almost unlimited commodity. However, it is now becoming clear that the rise of the Chinese economy is stretching the capacity of fossil energy producers to keep up, and the price flow-on affects consumers around the world.

While Saudi Oil Minister Sheik Yamani famously stated in the 1970's that "the stone age did not end because the world ran out of stones," the capacity to supply fossil fuels is currently having difficulty keeping up with significant demand growth. Instability in key supply regions such as the Middle East, Africa and Venezuela, disasters related to deep water drilling and the sheer amount of capital needed to expand mines, transport, port infrastructure and shipping capacity are all becoming constraints. This is before we even consider the risks associated with global climate change.

There are many different renewable energy systems that can help to diversify and reduce risk levels in the energy systems of the world. Among these are several rapidly growing energy systems based on biomass from waste, agriculture and forestry. These include the following:

### Electricity Production:

1. Pelletized biomass systems that extract moisture, compact the biomass into pellets and create a readily transportable bio-energy fuel<sup>22</sup>
2. Coal fired power plants are seeking to mix biomass with traditional coal fuel and create co-fired electricity which is at least partly renewable
3. Freestanding biomass energy facilities in areas of high base load power cost; biomass energy is most similar to coal-fired energy systems as it can be run in response to demand, rather than limited by wind or sunshine
4. Combined heat and power systems that can provide both steam and electricity from biomass

### Liquid Fuels:

1. Active research and pilot projects for cellulosic ethanol production; woody biomass is seen as a more sustainable supply source for ethanol than food crops like corn

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<sup>21</sup> Australian Financial Review, January 23, 2011, "Negatives pile in on Bluescope"

<sup>22</sup> For some background to the production of wood pellets for energy in the US see <http://www.woodpellets.com/heating-fuels/pellet-processing.aspx>

2. Bio-gasification technologies, namely pyrolysis, that heat wood and collect gases for liquid fuels such as bio-diesel,<sup>23</sup> often in concert with charcoal production
3. Bio-engineering systems that can transform the chemical constituents of woody biomass into a range of liquid fuels, resins, biodegradable materials and even rubber<sup>24</sup>

#### Charcoal and Char-Based Products:

1. Low ash content wood charcoal, now becoming competitive with coking coal, for producing high carbon steel
2. High grade charcoal as a reductant in smelting minerals, including silicon for computer chips and solar cells<sup>25</sup>
3. Filtration charcoal in mineral processing, water purification and other uses
4. Biochar as a soil amendment for improving nutrient retention, water holding capacity and overall soil fertility<sup>26</sup>

This range of emerging markets could dwarf the demand for wood for traditional uses of paper, building materials and consumer goods.<sup>27</sup> In many cases the energy component can be integrated with the traditional uses or use the waste or by-products of other processing systems. There are now a range of government grants, loan facilities and research work to accelerate the development of these technologies and many are moving beyond the pilot stage into operations.

With rising fossil energy prices and continuing pressure for alternatives to the atmospheric impacts of fossil energy, look to see these systems emerge as a major new market supporting forestry production. As we discussed above, these energy systems may initially rely on waste streams from traditional forestry management systems, both semi-natural and plantation. However, expect to see dedicated systems of high productivity energy crops emerge that will be co-located with the processing facilities, reducing transport cost and focussed on specific genetic varieties, management regimes and systems of harvest and processing. This may become a specialty investment area within the overall timberland investment asset class.

## 6. Restructuring of Traditional Timber Trading Patterns – Asia's Emergence

While these exciting new markets grow, it is important to also consider that the traditional uses of wood are growing, evolving and also responding to shifts in demand drivers. As noted earlier, global timber trade is in the order of US\$200 billion per annum. In the past, much of the demand was driven by the large, sophisticated markets of the US, Europe and Japan. Long-term trade patterns emerged around a number of

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<sup>23</sup> Olli Haltia, Managing Director of Dasos, Pty, Ltd presented data at Timber Invest Europe, October 2010, showing that each 2 million cubic metres of timber in Finland could produce 200,000 tonnes of bio-diesel, which would represent 4.5% of fuel use in Finnish Vehicles

<sup>24</sup> See for example <http://www.biopreferred.gov/?SMSESSION=NO>

<sup>25</sup> New Forests estimates that, at the peak coking coal prices, we are now seeing that carbon from charcoal may compete with woodchip export buyers for E. globulus timber.

<sup>26</sup> For background see <http://www.csiro.au/resources/Biochar-Factsheet.html>

<sup>27</sup> For example Forisk Consulting suggests US biomass energy demand for electricity, pellets and liquid fuels will exceed 60 million tonnes per annum by 2020. [http://www.forisk.com/UserFiles/File/WBUS\\_Free\\_201012.pdf](http://www.forisk.com/UserFiles/File/WBUS_Free_201012.pdf) and RISI has forecast that EU demand for biomass would need to reach 330 million tonnes by 2020 to meet regulatory obligations, almost equal to the total annual EU timber production.

large commodity markets: Canadian lumber exports to support housing construction in the US; Canadian newsprint exports to US newspapers; tropical hardwood imports to Europe for furniture, flooring and construction materials; and eucalyptus woodchip from the Southern Hemisphere to Japanese pulp mills. While these markets remain, the financial crisis and rise of China and, to a lesser extent, India are restructuring global timber markets. In addition, large domestic markets have continued in the US and Europe, where semi-natural managed forests remain a significant part of the land base.

However, the world is changing. US housing starts have tumbled from a peak of 1.7 million units in 2006 to 500,000 in 2009. As the internet becomes a larger and larger source of news and information, newsprint markets have collapsed and former newsprint companies are restructuring and shifting their product mix.<sup>28</sup> China has emerged as the world's leading wood products exporter, including furniture, flooring, plywood and other materials. Japan's aging pulp mills are likely to be shut down and replaced by new state of the art pulp and paper capacity in China. We even have the strange circumstance of the US and Canada now seeing significant growth in both log and lumber exports to China.<sup>29</sup>

If China determines that the next phase of its growth is to drive domestic demand, wood imports could surge further. It should be noted that Chinese housing starts in 2010 were estimated at 10 million units, so there is already a significant timber demand. New Zealand timber exports to China have increased four-fold since 2008.<sup>30</sup> Even with Chinese growth moderating to 7.5% per annum over the next few years, it is forecast by the Economist to surpass the US in GDP by 2019 (although Goldman Sachs has separately suggested this will occur in 2027). The challenge for China had been to try to manage its domestic forest resources to achieve a significant degree of self-sufficiency in timber resources. That policy objective now appears to be unachievable, and log and lumber imports continue to surge.

Where this leads is to a restructuring of the market that is already underway. The emergence of China, India and Brazil as major economies means that a new large net demand source must be accommodated. This accommodation is occurring by:

- taking up slack in supply side markets like New Zealand;
- diverting timber from historical trade flows or weakened domestic consumption markets such as the North American softwood, European hardwood markets and Japanese pulp and paper markets;
- price increases and policies that support expansion of domestic forestry in China; and
- price increases and policies that support the expansion of high productivity plantations in tropical Asia, Africa and the southern temperate regions of Latin America, Australia and New Zealand.

While the "China story" may support North American timberland valuations to some extent, we believe that the big winners will be the high productivity plantation regions. These plantation regions are set up to be able to provide consistent supply of uniform quality logs and lumber. We also believe that proximity to the Chinese and Indian markets will benefit Australia, New Zealand and particularly Asian forestry investments. We are particularly positive on Asia as it has the capacity to expand its plantation estate substantially, a

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<sup>28</sup> As an example see <http://www.bowater.com/en/?langtype=4105>

<sup>29</sup> Hakan Ekstrom, editor of the Wood Resources Quarterly, recently circulated a release noting that US and Canadian log and lumber exports to China reached \$1.6 billion in 2010, a 150% increase on 2009 and a tenfold increase on 2006.

<sup>30</sup> See New Zealand Timber Industry Federation News, Dec. 23<sup>rd</sup>, 2010 <http://www.nztif.co.nz/news-item.php?id=83>

relatively low cost structure and the ability to produce high value hardwood timbers that are in particularly short supply. The high volatility of shipping costs over the past few years would also suggest that local supply will have a competitive advantage. As noted earlier, we believe that a rationalization of plantation ownership, already well advanced in New Zealand, will occur in Australia and southeast Asia. Once this process of acquisition and consolidation of fragmented estates by institutional investors occurs, then greenfield plantation investments will provide the opportunity for incremental investments, either via expansion of core assets or as new developments.

## 7. Environmental Markets and Global Supply Chains

The promise of significant benefits to timberland investors from carbon markets, conservation payments and other forms of “ecosystem services” markets has been an area of continuing interest to New Forests. We consider these environmental markets to include compliance or voluntary schemes for forest-based carbon, including reduced emissions from deforestation and degradation (REDD); wetlands mitigation banking in the United States; conservation, species or biodiversity banking in the United States, Europe and Australia; point to non-point source trading in nutrients and other forms of water pollution; and sustainability certification/accreditation programs for agribusiness, mining or other international commodity businesses. Where we stand today is that these markets remain relatively small but steadily growing.

### *Carbon*

If we start with carbon, the forest-based component of the US\$100 billion per annum global carbon market is currently insignificant. This is primarily because the original Kyoto Protocol and its flexibility mechanisms, such as the CDM,<sup>31</sup> and the EU Emissions Trading Scheme (EU ETS) have essentially excluded forest carbon credits. Since 2007, however, there has been a growing recognition that reducing deforestation by funding the conservation of forests, particularly in tropical developing countries, is a huge and immediate opportunity to slow the growth rate of greenhouse gas emissions. At both the Copenhagen and Cancun meetings of the UN Framework Convention on Climate Change, Reducing Emissions from Deforestation and Degradation (REDD) has been a central theme with widespread international support. Despite huge initial interest in REDD, particularly from US policymakers working on a climate bill in 2009-2010, converting policy intent into action will take time. We expect a 3-5 year period of organizational work, capacity building and rule-setting, largely led by governments and inter-governmental organizations like the World Bank. If REDD is eventually integrated into regional, national or international carbon trading mechanisms, conserving the world’s forests could generate a large and valuable carbon asset class.<sup>32</sup>

Of more immediate interest is California’s Assembly Bill 32 (AB32), which creates a cap and trade regime to reduce emissions in California. The cap and trade system will become operational in 2012<sup>33</sup> and will include

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<sup>31</sup> The CDM is the Clean Development Mechanism, an instrument of the Kyoto Protocol whereby emission reduction projects in developing countries can sell credits to developed countries or regulated entities with emission reduction targets. While reforestation projects are permitted under the CDM (forest conservation projects are not permitted), they represent less than 1% of project credits in the system and trade at a steep discount due to rules related to the non-permanence of forest-based credits.

<sup>32</sup> Forecasts of forestry providing 20% of the necessary global emissions reductions from a business as usual scenario in 2030 would suggest an annual primary market for forestry offsets of 5 billion tonnes per annum by 2030. This could represent a cash flow of US\$100 billion per annum to the world’s forests at that point.

<sup>33</sup> See <http://www.carbonpositive.net/viewarticle.aspx?articleID=2220>

a range of forest-based offset protocols. Rules for the inclusion of REDD credits are also in development and expected to enter the market in volume in approximately 2015. While the California market will be much smaller than the annual turnover of approximately \$100 billion in EU ETS, demand will be around 230 million tonnes of offsets valued at US\$3-8 billion between now and 2020.<sup>34</sup> This is sufficient scale to develop business models and investment structures. If the market expands to integrate with other US states and Canadian provinces, such as the Western Climate Initiative, it could double in size.

California is firmly positioned as a test bed or incubator for the role of forest carbon in compliance markets, which will likely expand to other regions and potentially to international regimes in the near future. We see opportunities for new business models, such as the aggregation of individual landowners into carbon “pools” that efficiently organize offset supply and the alignment of private investment in REDD activities with national forest management strategies in key conservation hotspots in Brazil and Indonesia.

### **Biodiversity**

In the US, regulated markets for wetlands and species are based on “no net loss” provisions in the federal *Clean Water Act* and *Endangered Species Act*, respectively. As they are linked to real estate markets, we saw a market contraction in 2009, particularly in California and Florida, but through that process the industry has matured. There is a growing capacity in these markets for project development, property management and due diligence services such as mitigation credit demand studies. The regulatory system also seems to be stabilizing, and the US government has re-iterated its support for wetlands mitigation via a revised rule and guidance from the US Environmental Protection Agency and the Army Corps of Engineers on compensatory mitigation, setting a regulatory preference for mitigation banking over other mechanisms.<sup>35</sup>

The mitigation banking concept appears to be expanding steadily internationally with the United Kingdom and France recently starting pilot projects and mitigation programs operating in Australia, such as reverse auctions for native revegetation<sup>36</sup> and offset schemes linked to the development approval process.<sup>37</sup> There is also a growing demand for “compensatory mitigation” as a tool to facilitate accreditation of major international agri-business commodities like soybeans, palm oil, sugar cocoa, and beef. In these commodities a number of “Roundtables” have been established to bring together producers, end users and environmental NGO’s to establish rules for sustainable production that can be labelled and tracked through the supply chain.<sup>38</sup> These certification and labelling schemes, much like the Forest Stewardship Council certification of sustainable forestry,<sup>39</sup> are driven by major corporate brands like Nestle and Unilever, who have been subject to viral campaigns against their products, especially those containing palm oil. Bringing in standardized approaches to compensatory mitigation via mitigation banks could be a major win-win solution to both producers and downstream corporations.

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<sup>34</sup> See <http://www.newforests.com.au/news/pdf/articles/CaliforniaCarbonMarket2010.php>

<sup>35</sup> See <http://www.newforests.com.au/news/pdf/articles/MarketOutlookUSMitBanking.php>

<sup>36</sup> See

<http://www.dpi.vic.gov.au/DSE/nrence.nsf/LinkView/15F9D8C40FE51BE64A256A72007E12DC37EBE3A50C29F4F8CA2573B6001A84D5>

<sup>37</sup> See <http://www.environment.nsw.gov.au/biobanking/>

<sup>38</sup> For further information see [http://wwf.panda.org/about\\_our\\_earth/all\\_publications/?198253/Forest-Conversion-News-28](http://wwf.panda.org/about_our_earth/all_publications/?198253/Forest-Conversion-News-28)

<sup>39</sup> See [www.fsc.org](http://www.fsc.org)

These markets can be complex and face continuing regulatory and standard setting risks. However, with adept management, they can be attractive investment opportunities through a “timber plus” or direct investment approach. A timber plus approach integrates carbon market exposures and other environmental market instruments into traditional timberland investments. While most timber funds have a capacity to add value in this way, it is usually in the 100 to 200 basis point range, primarily because the underlying land and timber values are such a heavy asset relative to the value of the environmental attributes. As the environmental markets mature, investors can take scalable positions directly in forest carbon projects and biodiversity banks as higher return direct investment opportunities.

Looking at the forestry sector in general, there may be an argument to carve out specialty funds around energy cropping, biomass materials, mitigation banking, forest carbon and mitigation banking. This type of “special opportunities fund” or “future directions fund” may provide institutional investors with an opportunity to explore these emerging markets that may become a mainstream part of the timberland investment space in the coming years.

## **8. A Landscape-Based Vision for Land Management – Integrating Production and Conservation**

Investors are rightly concerned about what constitutes sustainable forestry investment. Forestry has been complex and subject to a long running set of controversies with environmental and social NGO’s. These issues have centred on the logging of natural forests, clearing of natural forests for plantations, poor community relations and poor operational practices and controls. Even more confusing is the fact that the issues are not consistent from country to country or region to region and, in some cases, the same practice (e.g. intensive plantations) is considered responsible in one place and destructive in another.

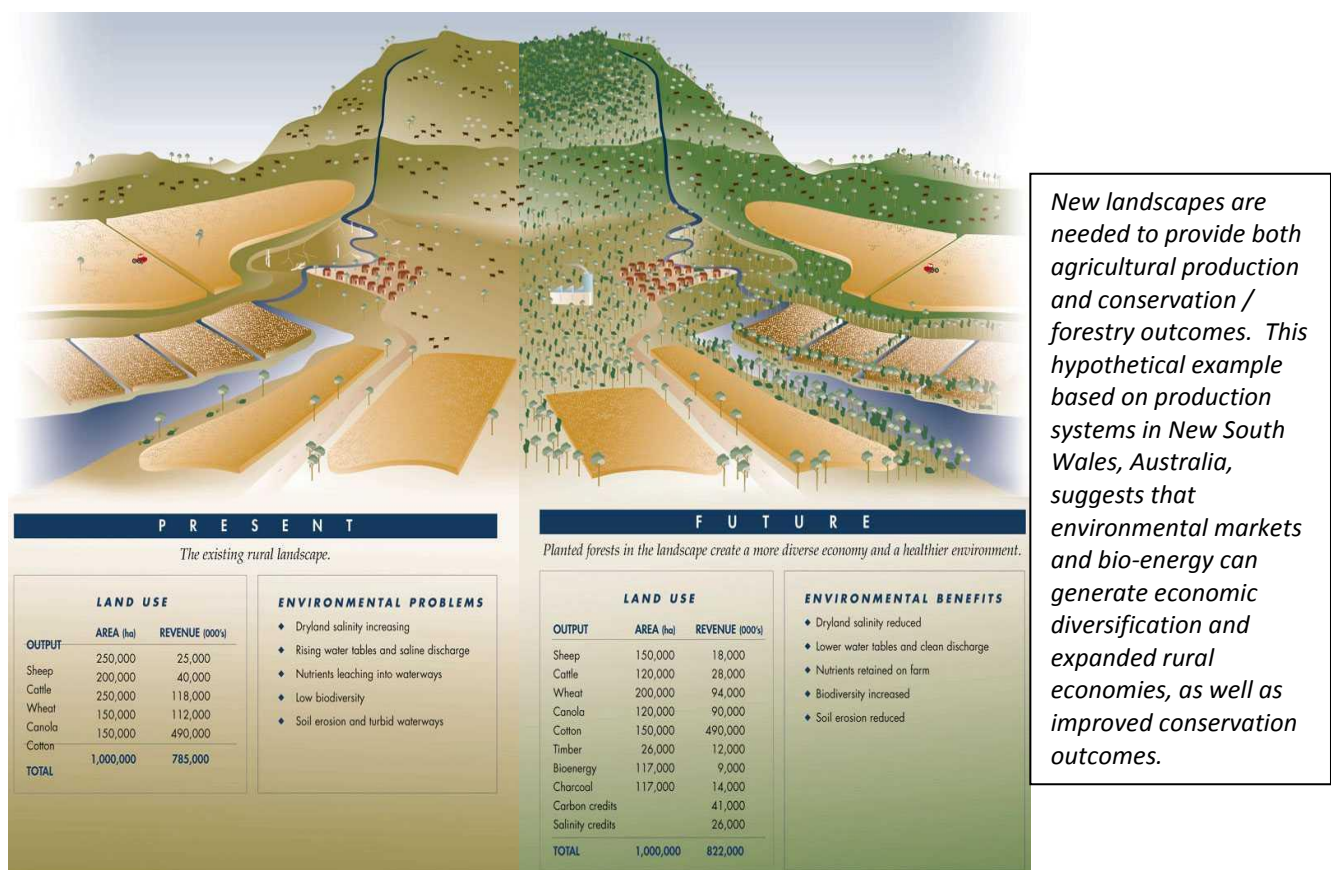
To assist investors in navigating these issues, there is a move toward certification of sustainable forest management via the Forest Stewardship Council and other standards. These standards are usually based on a global set of principles and refined into national guidelines to ensure locally appropriate interpretation and implementation. While these systems have had some growing pains, they appear to be maturing to the point where they can be relied upon as a basic screen for investments and investment management performance.

However, as we look forward, the conflict over land and natural resources is likely to create further complexity and challenges. We are moving to a world where there is extraordinary pressure on land and ecosystems. Not only do we want to see the conservation of biodiversity and recovery of endangered species, but we need to conserve fresh water resources, water quality and the ability to manage floods and droughts. We also recognize that forests are a huge part of the global carbon cycle – the carbon emissions externalities of further forest clearing are unacceptable. At the same time our growing population and growing affluence demands more grains, more vegetable oils, more animal feed and meat production, more timber and more energy. How are we going to create some form of end-game that meets both our conservation and production needs?



We believe that the convergence of sophisticated models of landscape function with rapidly growing technology for monitoring and analysis may start to create the conditions for landscape scale management systems (see Figure 2). These will design conservation management systems that include core reserves (potentially established as commercial biodiversity banks and REDD projects), connectivity corridors and protection of critical features like wetlands and riparian zones. Intensive plantations can be linked with sustainably managed natural forests and conservation reserves in a mosaic or integrated system. Where these systems interface with agribusiness, such as beef, palm oil or soybean crops, there is an opportunity for partnerships where the high impact land uses fund conservation components. Ultimately, these outcomes will need to be driven by government regulation and/or consumer demand, as they do add costs to management.<sup>40</sup>

**Figure 2 – New Models for Landscaped-Based Management**



Source: New Forests

Another likely option will be agro-forestry systems that link together intensive timber plantations, agribusiness crops and conservation management into integrated investments. In many cases these systems can integrate community agriculture and traditional land use in a stable and sustainable management system. One key benefit of integrating forestry and agriculture is that local subsistence or traditional communities can allocate their time between subsistence or market agriculture and working in the plantation management operations. In many cases the plantation work can be scheduled to occur in times of low management requirements for agriculture.

<sup>40</sup> See [www.maluabiobank.com](http://www.maluabiobank.com) for an example of this type of initiative.

As institutional investors expand beyond the US, it is important to consider local conditions and novel management regimes and systems that fit the local social and environmental context. These systems may be quite different from US timberland management models, and investors will need to understand how these conditions affect returns, risk factors and manager selection.

## 9. Risks, Returns and Investible Assets in the Forestry Sector

This section considers the assumptions in timberland around discount rate, investible assets and the pricing of individual assets relative to risk in light of the trends discussed. To review:

- the nature of the timberland asset class is shifting from investments in semi-natural forests to high yield plantations;
- the geographic distribution of investment opportunities is migrating from being dominated by the US to include Latin America, Australia, New Zealand, Asia and Africa;
- market opportunities are diversifying away from traditional pulp, sawntimber and feature grade logs to include renewable energy, woody biomass-based materials and ecosystem markets; and
- innovative managers are creating diverse regimes that encompass high production plantations, agriculture and conservation management systems.

Investors need to evaluate these trends from a valuation and risk management perspective. In the absence of liquid and transparent markets to set market prices, the central role of discounted cash flow asset valuation will remain. The general approach, which investors are likely to continue to apply for the foreseeable future, builds on the US risk-free rate, usually defined as the yield on US treasury bills (currently close to zero). A “timberland risk premium” is added to the risk-free rate; by practice this has been approximately 600 basis points in the US market, which accounts for both investment risks and the illiquidity premium of timberland investing. This is generally used as a kind of industry baseline for expected timberland returns.

Risks associated with non-US markets are built on top of the US timberland discount rate. For example, investors may add another 400 to 600 basis points for investments in Brazil to reflect risks associated with currency, political risk and a generally less robust business environment.<sup>41</sup> Australia, on the other hand, is usually valued at only 100 basis points higher than the US, primarily to account for currency risk. In setting target rates for emerging markets in Asia or Africa, the higher yield on sovereign debt is often used as a proxy for how much higher the forestry return should be relative to the US timberland discount rates.

With a country risk threshold set, the relative riskiness of cash flows from a particular asset must also be evaluated. Mature forests with well secured cash flows may trade below the country level discount rate (e.g. rubberwood plantations in Malaysia have been grown for 100 years and markets are very mature and technical risk is low), but greenfield plantations or mixed agro-forestry systems may require higher discount rates to compensate for execution risk and market risk. In specialty markets like emerging ecosystem markets or new energy crops, investors need to make a judgement around execution risk, market risk and other factors that may create more volatility; assumptions about expected cash flows are less reliable for

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<sup>41</sup> In a recent newsletter Brookfield asset management suggested that a 600 bp premium would be needed to equilibrate the risks in Brazil vs. similar plantations of loblolly pine in the southern US.

emerging markets or asset classes. In short, forestry valuation is both art and science, reflecting less quantifiable aspects like seller motivation and transaction complexity. For example, disciplined buyers have acquired failed Managed Investment Scheme timberland assets in Australia at attractive pricing relative to expected risk adjusted discount rates as a result of factors outside of mechanistic asset valuation techniques.

As with any asset class, diversification helps to reduce risk or at least remove asset-specific risk. Investing in a timberland fund is useful in providing diversification of asset types and locations that would otherwise be difficult for investors to achieve individually. Additionally, the fact that the trees keep growing buffers some of the risk inherent in commodity markets and can lead to appreciating asset values.

## 10. A Forestry Investment Portfolio for the Next 5 Years

Choosing a diversified portfolio for a timberland investment strategy has to take account of the circumstances of the particular investor, including currency, willingness to accept risk, (including whether there is a willingness to invest in emerging markets), tax circumstances and size of allocation. In this general paper it is impossible to make any definitive statement of an optimum portfolio for any investor.

However, as a hypothetical or general portfolio allocation against the trends we have discussed in this paper the following might be an approach:

- USA and Canada 30-40%<sup>42</sup>
- Latin America 25%
- Australia New Zealand 15%
- Emerging Markets (Asia, Africa, Eastern Europe) 15%
- Specialty Market Strategies (ecosystem services markets, specialty energy farms or unique timbers in USA or non-USA ) 5-10%

This portfolio would effectively be underweight to the US where, as noted earlier, 60 to 70% of investible assets are located, but where total returns (as measured by NCREIF<sup>43</sup>) have been steadily declining over the past 23 years by 100 bp per annum with cash yield declining from 8% per annum to 3% per annum.<sup>44</sup> While US timberland prices have been declining recently after a very long run of cap rate compression, and there is an expectation that returns will rebound somewhat in future, we believe that the structural changes in the timberland market suggest more exposure to the plantation timber areas, emerging markets and specialty strategies. This may rely on a multi-manager approach with an effort made to use specialist managers who can understand each of the markets and the appropriate investment approach in each. Based on an expected return from each region and strategy, this portfolio should deliver a 9% real IRR at the portfolio level over ten years. Studies of US high quality bond markets show long term returns of 1.8% and 6% for US equities, so this represents about a 300 bp premium for the risks associated with a diversified international exposure to the timberland asset class.<sup>45</sup> As mentioned at the outset, the benefits of forestry investment go

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<sup>42</sup> US investors who are investing in US dollars may seek the higher exposure to US assets.

<sup>43</sup> The National Council of Real Estate Investment Fiduciaries has tracked timberland returns in the US from 1987.

<sup>44</sup> Data presented by Clark Binkley at Timber Invest Europe, October 26, 2010.

<sup>45</sup> See <http://www.cfapubs.org/toc/rf/2010/2010/1> for a comprehensive review of portfolio allocation and trends in investment management.

beyond simply returns and include the diversification benefits associated with lower total return volatility, inflation correlation and linkages to global sustainability issues.

## **11. Conclusion**

This paper has tried to identify and discuss the major factors that may affect the evolution of the timberland asset class in the coming years. The big factors relate to the future growth of China, India and other major emerging sources of timber demand, and how the world will address rising challenges related to energy security, climate change and biodiversity conservation. We have tried to put forward our ideas on the main trends and how they will play out, but readers are urged to take any predictions with a healthy grain of salt.

In designing its investment strategies, New Forests has created a coherent set of three investment programs that focus on the rising Asia Pacific timberland markets and the emerging environmental markets. These strategies are designed to reflect the ideas and general observations in this paper. Please contact us with comments, questions and for further information on our investment programs.